Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems	)	ET Docket No. 00-258
	)	
Petition for Rulemaking of the Cellular Telecommunications Industry Association Concerning Implementation of WRC-2000: Review of Spectrum and Regulatory Requirements for IMT-2000	)	RM-9920
	)	
Amendment of the U.S. Table of Frequency Allocations to Designate the 2500-2520/2670-2690 MHz Frequency Bands for the Mobile-Satellite Service	)	RM-9911

COMMENTS OF MOTOROLA ON FINAL FCC AND NTIA STAFF REPORTS

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Summary

The 3G spectrum reallocation reports released by the NTIA and FCC make it clear that the task of finding spectrum to enable continued growth and development of commercial mobile services in the U.S. is a difficult and complex one. However, given the importance of this effort, it is a task that must not be deterred. While there is a need for the U.S. to act quickly in finding additional spectrum, the complexity of the issues under consideration require considerable additional dialog to develop solutions that benefit all parties. This process must not be driven to an unsuccessful conclusion by arbitrary deadlines. The FCC should take a leadership role in working with NTIA and concerned parties to address the myriad regulatory issues associated with making the 1710-1850 MHz band available for 3G services. The NTIA and DoD reports describe the difficulties in timing and band segmentation options. It is readily apparent that only intensive and cooperative effort will lead to a solution that provides phased availability of spectrum, along with appropriate technical rules. Motorola looks forward to working with the FCC, NTIA, DoD, and other Federal agencies on this process.

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COMMENTS OF MOTOROLA ON FINAL FCC AND NTIA STAFF REPORTS

Motorola, Inc. ("Motorola") provides these comments in response to the Federal Communications Commission's ("FCC's") Public Notice seeking comments on National Telecommunications and Information ("NTIA") and FCC staff reports regarding use of the 1710-1850 MHz and 2500-2690 MHz bands respectively, and the potential for accommodating third generation ("3G") commercial mobile services in these bands.[1] These reports, that discuss a variety of technical and economic consequences for possible

[1] *See* FCC Releases Staff Final Report "Spectrum Study of 2500-2690 MHz Band: The Potential for Accommodating Third Generation Mobile Systems" Seeks Comment on Final Report in Pending Spectrum Allocation Proceeding (ET Docket No. 00-258); *Public Notice*, DA 01-786, rel. March 30, 2001.

reallocations of existing spectrum, demonstrate the daunting task facing the government to make additional spectrum available for 3G services. However, for the wireless industry and U.S. economy to sustain growth in the competitive global marketplace, difficult spectrum allocation choices must be made. Furthermore, without timely allocation decisions, the ever increasing demand for mobile data, voice, Internet and video services will be unmet in the United States, and greater domestic differences from international wireless services, equipment, and spectrum allocations will be created.

As described in previous comments filed in this proceeding, Motorola believes that, given it's unique position as a global band for commercial mobile services, the 1710-1850 MHz band should be made available for 3G services in the U.S.[2] The NTIA report, as well as supporting reports released by the Department of Defense ("DoD") and Air Force, provide information on hurdles that must be overcome to make the band available. While the identified reallocation tasks are significant, they are not insurmountable. Motorola strongly encourages the Commission, working with NTIA, Federal Government agencies, and the private sector, to actively pursue ways to accommodate the affected parties and help lay the foundation for the future of mobile communications. As noted by Secretary of Commerce Donald Evans, "The NTIA report issued today sheds additional light on the challenge we face, yet it is but one early step in an on-going, comprehensive process."[3]

Motorola submits that a framework for moving forward to address these challenges was provided in joint comments filed by the Cellular Telecommunications & Internet Association ("CTIA"), Telecommunications Industry Association ("TIA"), and

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[2] *See* Motorola Comments of February 22, 2001 at 13.

the Personal Communications Industry Association ("PCIA").[4] These comments provide solutions for accommodating the requirements of Federal Government users as well as providing spectrum for 3G services. While there still remains considerable work to be done to finalize details of a solution, the joint comments provide mechanisms that will enable efficient use of spectrum. Such efficiencies are gained through shared used of the 1710-1850 MHz band between Government and non-Government users and harmonized global use of DoD spectrum. Implementation of this consensus solution provides for a strong military as well as a robust wireless industry and would enhance the U.S. economy through continued growth of the nascent wireless industry.

Although the recommendations in the Association Group report were prepared and submitted during the course of an industry outreach program conducted by NTIA, the recommendations were either not addressed or were dismissed without discussion in the NTIA report. A process for continued dialog is necessary to provide serious consideration of industry proposals and to address new information included in the recent reports. To the extent that regulatory changes are necessary to allow greater sharing in non-Government bands to enable the military greater flexibility in meeting its communications requirements, the FCC should play a leadership role in considering such changes.

The continuing dialog on these issues should include consideration of how DoD operates outside of the U.S. The military appropriately seeks to simulate actual combat

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[3] *See Statement by U.S. Secretary of Commerce Donald L. Evans Regarding NTIA Technical Study on Spectrum for 3G*, March 30, 2001.

operations as best as practical during training to maintain peak effectiveness and readiness. As such, combat training and simulation take place around the world under a variety of conditions and circumstances. However, with the global use of the 1710-1850 MHz band for commercial mobile services, an unanswered question is how the military meets its training and deployment requirements outside of the U.S. While there is some brief mention in the DoD report of host nation agreements for some uses, there are no details of these agreements.[5] Since the proposals put forth by the industry contemplate continued Government access to at least portions of the band, it seems that consideration of operations outside of the U.S. may shed some light on acceptable approaches to such DoD sharing with commercial mobile systems.

I. Background

3G wireless services represent the convergence of two of the fastest growing sectors of the U.S. economy – wireless services and the Internet. Filings throughout this proceeding have documented the economic benefits of these services to the U.S. and the requirement for additional spectrum to provide continued growth. For example, AT&T Wireless states that while it "is confident" that existing allocations are sufficient "**to begin**" the rollout of 3G, the data intensive nature of these services coupled with "growing consumer and business penetration" is expected to produce a significant increase in capacity demand.[6] AT&T Wireless concludes that "it is clear that improvements in technology and spectrum efficiency will not be sufficient to meet this

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[4] *See* Joint Comments of the Cellular Telecommunications & Internet Association, Telecommunications Industry Association, Personal Communications Industry Association ("the Association Group") filed February 22, 2001 ("Association Group Comments").

[5] *See* Department of Defense, *Investigation of the Feasibility of Accommodating the International Mobile Telecommunications (IMT) 2000 Within the 1755-1850 MHz Band* ("DoD Report"), February 9, 2001 at B-57.

[6] *See* Comments of AT&T Wireless Services, Inc. at 4,5 [emphasis in original].

rise in demand."[7] Similarly, Verizon Wireless argues that "the likely deployment of 3G services in existing allocations does not obviate the need for additional spectrum."[8] Indicating that it will soon deploy a 3G technology that will provide customers with data rates of 144 kbps, Verizon notes that it "will only be able to serve about one-third the number of customers simultaneously at these higher rates."[9] Thus, "while 3G technologies will provide spectrum efficiency improvements, the net effect is that substantially more spectrum will be required to provide high-speed 3G services to the same number of customers."[10] Verizon also cautions the Commission against its proposed reliance on "secondary markets" mechanisms to make additional spectrum available for 3G.[11]

Other carriers echo this same refrain. Qwest Wireless states that "it is apparent that to accommodate 3G services, … the allocation of additional spectrum below 3 GHz, and the licensing of that spectrum expeditiously, will be necessary to meet … demand."[12] Cingular argues that existing allocations are being used as efficiently as possible and capacity constraints limit the extent to which new services can be offered.[13] Cingular points out that cellular licensees are particularly limited because they are precluded from performing a "complete switch-over to more spectrally-efficient technologies" due to the continuing requirement for cellular carriers to provide analog service.[14] Cingular argues

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7 *Id.* at 5.
8 *See* Comments of Verizon Wireless at 5.
9 *Id.* at 6.
10 *Id*.
11 *Id.* at 32.
12 *See* Comments of Qwest Wireless, LLC at 2.
13 *See* Comments of Cingular Wireless, LLC at 3.
14 *Id*.

that "at least 160 MHz of additional spectrum below 3 GHz is needed to support the development of 3G services in the United States."[15]

Manufacturers also provide broad support for additional allocations for 3G. Arguing that the "future competitiveness of U.S. industry is very much at stake," the TIA believes that "it is now time for the Commission to allocate additional spectrum for IMT-2000 services in the United States."[16] Noting that WRC-2000 recommended that "on the order of 160 MHz of additional spectrum will be needed in order to meet the projected requirements of IMT-2000," TIA argues that "additional spectrum must be made available that is suitable for advanced communications systems, such as 3G mobile systems."[17]

All of these commenters are in essential agreement with Motorola's position that the "allocation of additional spectrum for the provision of 3G wireless services is essential to enable the rapid development" of advanced wireless services.[18] Failure to provide the necessary critical mass of spectrum for 3G services will deprive the U.S. of dramatic economic gains such as those forecasted by the Council of Economic Advisors who postulate that "an additional 150 MHz of spectrum [for advanced wireless services] could bring an additional $35.7 billion of service revenues per year."[19]

Recognizing the importance of mobile communications to the economy and to making information available to as diverse number of people as possible, a process was initiated by the Administration to identify spectrum to enable the continued growth of the

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15 *Id.* at 8.
16 *See* Comments of the Telecommunications Industry Association at 3.
17 *Id.* at 2,3.
18 *See* Comments of Motorola at 5.

industry.[20] The initiative was focused on the 1710-1850 MHz and 2500-2690 MHz bands, frequency bands identified by the International Telecommunications Union ("ITU") as global bands for implementation of IMT-2000 systems. In accordance with a schedule for proceeding provided by the Secretary of Commerce on October 20, 2000,[21] the NTIA and FCC released interim reports providing information on current use of the bands and preliminary requirements necessary to accommodate IMT-2000 services.[22] Following release of the interim reports, a Government outreach program was initiated whereby NTIA was to work with the FCC, Government agencies and the private sector to explore ways to accommodate IMT-2000 systems. To facilitate this outreach program, a joint Industry Association Group held a series of meetings to better understand the current uses of the bands and to jointly explore ways of accommodating 3G services while ensuring that the communications requirements of the other users were met.[23] On February 22, 2001, the Industry Association Group filed its report, including recommendations for accommodating 3G systems in the 1710-1850 MHz band.[24]

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19 *Id*. at 4. *See also*, The Council of Economic Advisors, *Economic Impact of Third Generation Wireless Technology*, Oct. 2000, at 6.

20 *See Presidential Memorandum, Subject: Advanced Mobile Communications/Third Generation Wireless Systems, The White* House, October 13, 2000.

21 *See* U.S. Department of Commerce, *Plan to Select Spectrum for Third Generation (3G) Wireless Systems in the United States* (Oct. 20, 2000), available at http://www.ntia.doc.gov/ntiahome/threeg/3g_plan14.htm

22 *See* Federal Operations in the 1755-1850 MHz Band: The Potential for Accommodating Third Generation Mobile Systems, *Interim Report*, NTIA Special Publication 01-41 (rel. November 15, 2000); FCC Staff Releases Its Interim Report on Spectrum Study of the 2500-2690 MHz Band (ET Docket No. 00-232), *Public Notice*, DA 00-2583 (rel. November 15, 2000).

23 *See* Memorandum from Michael Altschul/Cellular Telecommunications Industry Association, Robert L. Hoggarth/ Personal Communications Industry Association, and Grant E. Seiffert/Telecommunications Industry Association to Assistant Secretary Rohde/NTIA and Chairman Kennard/FCC, establishing the Industry Association Group, December 8, 2000.

24 *See* Association Group Comments, filed February 22, 2001 in ET Docket No. 00-258.

Recommendations included sharing and relocation options for all of the systems for which information had been provided to date.[25]

On March 30, 2001, NTIA and the FCC released final staff reports with greater detail about the systems and services in the frequency bands under consideration and the potential for accommodating 3G services.[26] Concurrently, the FCC requested comments on the reports.[27]

II. The NTIA Report

The NTIA report uses information provided by Government agencies as the primary source of information in developing its report. Most notably, NTIA bases its report on a February 9, 2001 report by the DoD.[28] Unfortunately the NTIA report, for the most part, ignores proposals of the industry or dismisses the proposals without serious discussion. This lack of consideration is unfortunate, since it appears from the information in the DoD report that there is potential for accommodating IMT-2000 systems in the 1710-1850 MHz band, although there are complex regulatory, technical, and timing issues that require greater discussion and thought. Resolution of these issues will only come through the cooperation of all involved parties, with sufficient time allotted to a full consideration of each affected party's concerns.

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25 *Id.* at 2-9.

26 *See* Spectrum Study of 2500-2690 MHz Band: The Potential for Accommodating Third Generation Mobile Systems, *Final Report*, (rel. March 30, 2001) ("FCC Final Report"); The Potential for Accommodating Third Generation Mobile Systems in the 1710-1850 MHz Band: Federal Operations, Relocation Costs, and Operational Impacts, *Final Report*, (rel. March 30, 2001) ("NTIA Final Report").

27 *See* FCC Releases Staff Final Report "Spectrum Study of 2500-2690 MHz Band: The Potential for Accommodating Third Generation Mobile Systems" Seeks Comment on Final Report in Pending Spectrum Allocation Proceeding (ET Docket No. 00-258); *Public Notice*, DA 01-786, rel. March 30, 2001.

28 *See* Department of Defense, *Investigation of the Feasibility of Accommodating the International Mobile Telecommunications (IMT) 2000 Within the 1755-1850 MHz band*, February 9, 2001 ("DoD Report").

Given the short timeframe provided for comment on the final NTIA and FCC reports, it is implausible for Motorola to offer an exhaustive evaluation of options and potential solutions. However, there are numerous areas where further investigation, cooperation and action will enable development of a plan that accommodates the requirements of all parties.

The DoD report divides the military systems into five categories: satellite operations, tactical radio relay, air combat training systems, tactical control links/precision-guided munitions, and other systems. The NTIA report also includes Conventional Fixed Systems. Four of these systems (satellite operations, tactical radio relay, air combat training, and Conventional fixed systems) were covered in the DoD and NTIA interim reports and were addressed in the joint Association Group filing. The interim reports gave no information on tactical control links/precision guided munitions and other systems. Accordingly, the private sector has not had an opportunity to review the systems and discuss options for satisfying these communications requirements while also accommodating 3G systems.

A. Satellite Control Systems

As described in the NTIA and DoD reports, satellite operations in the 1710-1850 MHz band are in the 1761-1842 MHz portion of the band and provide command and control for a wide variety of military satellites. The importance of these satellite systems to our national security and as sources of information and benefit to other Government agencies and the private sector is without question. Motorola therefore agrees that it would be unacceptable to disrupt their operation.

The satellite operations in the 1710-1850 MHz band are satellite control uplinks. Accordingly, the interference scenarios that require consideration are interference from 3G systems, both mobile and base transmitters, into the satellite receivers, and interference from the satellite control facilities into 3G systems. NTIA agrees with the Association Group report that interference from mobile 3G transmitters is limited to acceptable levels.[29] They disagree, however, with the Association Group report's conclusion that interference from 3G base station transmitters would also be limited to acceptable levels. NTIA incorrectly dismisses the findings of the Association Group as not being based on technical criteria accepted by the ITU.[30] In fact, the Association Group and DoD analyses are very similar, including that the peak power transmitted by the 3G base stations are nearly identical. However, the Association Group takes into consideration the antenna pattern for the base station, a well recognized and understood factor, whereas the DoD analysis assumes an omnidirectional antenna with peak radiation in all directions. Such a scenario is never found in actual system deployment for the types of systems under consideration. This assumption was discussed as part of the industry outreach program, but no modification was made from the initial DoD analysis to reflect antenna pattern information. In addition, the receiver threshold sensitivity for the DoD systems has changed from the initial report to the most recent report by 14 dB. This is quite a significant change and a better understanding of the reason for the change and whether or not it applies to a limited number of satellites is warranted. Taking these factors into account, it appears possible for 3G systems to share with existing satellites

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[29] *See* The Potential For Accommodating Third Generation Mobile Systems in the 1710-1850 MHz Band: Federal Operations, Relocation Costs, and Operational Impacts, *Final Report*, March 2001, U.S. Department of Commerce, ("NTIA Report") at xvi.

[30] *See* NTIA Report at 4-13.

through their end of life. Discussions should continue to resolve the differences in the analyses and to determine whether an agreement can be reached, such as limitations placed on 3G systems, to ensure that deployed systems correspond with the assumptions made in the interference analyses.

Regarding the other interference scenario, interference from space operation transmitters into 3G systems, the DoD report explores several mitigation methods, including relocation of satellite transmitters to remote areas, frequency coordination, or avoidance by 3G systems. These methods correspond to recommendations contained in the Association Group report and, while there are obstacles to implementation, these obstacles do not appear to be insurmountable. Continued discussions are warranted to further refine the details of such sharing.

Finally, the recommendation in the Association Group report is that DoD satellite operations should be moved to the 2025-2110 MHz band to provide for long-term, interference-free operation of both commercial mobile systems and DoD satellite systems. In its report, DoD recognizes that it is the only user of the 1761-1842 MHz band for satellite control operations and that these services are generally provided in the 2025-2110 MHz band.[31] One of the principal concerns that DoD has in moving its operations to the 2025-2110 MHz band is the regulatory status of such systems with respect to Electronic News Gathering (ENG) systems in the U.S. and the system's relative status under footnote US 346 to the Table of Frequency Allocations.[32] This is a regulatory, rather than a technical issue, and again, this problem is likely not

[31] *See* DoD Report at B-57.
[32] *See* 47 C.F.R. 2.106, footnote US 346.

insurmountable. The FCC should work proactively to ensure that both space systems and ENG operations are accommodated in the 2025-2110 MHz band.

B. Tactical Radio Relay and Air Combat Training Systems

Similar to the situation with space operations systems, there appears to be considerable room for continued discussions with respect to tactical radio relay and air combat training systems. The DoD report evaluates several sharing or frequency loss scenarios for these systems. The complexity of the situation is evident and the importance of the systems to maintaining combat readiness cannot and should not be questioned. The Association Group report, however, proposes solutions that provide continued access to the 1710-1850 MHz band for these systems in a way that is not considered in either the DoD or NTIA reports. These proposed solutions warrant additional study and discussion.

An evaluation of the Association Group proposals for tactical radio relay systems requires a better understanding of operational requirements in various areas of the country. While the DoD and NTIA reports indicate that access to this band must be maintained, they do not address in any detail differences in requirements that are dependent on the size and extent of the training exercises being conducted.

With respect to Joint Tactical Combat Training (JTCTS) systems, the DoD report focuses on use of wideband systems. Information in previous reports, confirmed in the industry discussions with DoD, indicate that use of the wideband JTCTS is only necessary over water. A further evaluation of band segmentation possibilities, as proposed in the Association report, based on use of the narrowband JTCTS is warranted. Further discussions should also be held to review possibilities for shorter-term band

segmentation to accommodate the Air Force's Air Combat Training System (ACMI) and the Navy Tactical Air Combat Training System (TACTS) based on some of the new information provided in the DoD report.

C. Other Systems

Information regarding a variety of other systems is provided for the first time in the NTIA and DoD reports. It is evident that these other systems add to the complexity of the task at hand. Additional time is required to better understand the requirements of these systems and develop solutions that meet the needs of the military and which make spectrum available for 3G services.

III. International Use of 1710-1850 MHz

One of the principal reasons for Motorola's preference for the 1710-1850 MHz band for 3G services is that the band is currently used on a global basis for commercial mobile systems. Use of this band for these services continues to grow, including in Region 2 where Brazil recently licensed spectrum in this band and numerous other countries have expressed an interest in licensing commercial services in the band.[33] As commercial operators increasingly become global operators, the availability of harmonized spectrum and systems becomes increasingly important due to economies of scale and the ability to deploy the same systems in the same time frame. This also helps ensure that U.S. citizens will enjoy the same level of advanced services enjoyed by citizens in other countries.

The DoD is also a global operator, maintaining bases, conducting training, and deploying communications systems around the world. Working and training with our

allies is an important part of the DoD mission. It is self-evident, therefore, that ensuring that DoD operations are compatible with operations around the world is important and beneficial and that any spectrum use review should take into consideration use of spectrum globally. Surprisingly, however, neither the DoD report nor the NTIA report address this issue in any substantive way. Any critical review of the potential for using the 1710-1850 MHz band for 3G services in the U.S. should also take into consideration international use of the band. While use in the U.S. may be justifiably different than in other countries, there are interference and sharing scenarios that might better help evaluation of options for use of the band in the U.S.

VI. Conclusion

The reports released by the NTIA and FCC on March 30, 2001, make it clear that the task of finding spectrum to enable continued growth and development of commercial mobile services in the U.S. is a difficult and complex one. However, given the importance of this effort to the U.S. economy, to overall U.S. competitiveness and efficiency, and to the telecommunications industry, it is a task that must not be deterred. While there is a need for the U.S. to act quickly in finding additional spectrum, the complexity of the issues under consideration require considerable additional dialog to develop solutions that benefit all parties. This process must not be driven to an unsuccessful conclusion by arbitrary deadlines. The FCC should take a leadership role in working with NTIA and concerned parties to address the myriad regulatory issues associated with making the 1710-1850 MHz band available for 3G services. The NTIA and DoD reports describe the difficulties in timing and band segmentation options. It is

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[33] *See* CITEL Inter-American Proposal to WRC-2000, supported by 11 CITEL countries, wherein the advantages of the 1710-1850 MHz band for IMT-2000 are described and support is expressed for

readily apparent that only intensive and cooperative effort will lead to a solution that provides phased availability of spectrum, along with appropriate technical rules. Motorola looks forward to working with the FCC, NTIA, DoD, and other Federal agencies on this process.

Respectfully submitted,

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identifying the 1710-1885 MHz band as a global IMT-2000 band.